

REMARKS

Claims 1-34, and 38-44 are pending in the application, of which, claims 1-3, 12-16, 25-28, 32-34 and 38-41 are withdrawn from consideration.

Claims 35-37 are cancelled.

Claim Amendments

Claims 6, 21, 30, and 42-44 have been amended. No new matter has been added. Support for the amendments to claims 42-44 may be found on page 58 of the Application.

Claim Rejections – 35 U.S.C. § 101

Claims 6, 21, 30, and 43 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter.

Claims 6, 21, 30, and 43 have been amended to clarify the claims. As amended, the claims are directed toward statutory subject matter, specifically, a computer storage medium.

Claim Rejections – 35 U.S.C. § 112

Claims 9-11 are rejected under 35 U.S.C. § 112, first paragraph, for not conveying a concise and exact definition in the term "virtual block allocation structure."

An example of a block allocation structure is given in "a virtual File Allocation Table (FAT) or similar block (e.g., cluster or sector) allocation structure." *See Application p. 44-45*. File allocation tables and virtual file allocation tables are well known in the art. Thus, a block allocation structure, similar to a file allocation table, is a structure describing the allocation of blocks. Such blocks may be clusters or sectors or other units of storage. Just as a file allocation table may be a virtual file allocation table, a block allocation structure may be a virtual block allocation structure. The Applicant respectfully requests that the Examiner withdraw the rejections of claims 9-11.

With regard to claims 4 and 5, the Examiner has requested clarification to the meaning of "storing changed logical block numbers."

A logical block number (LBN) is a reference to a block of data. A logical block number is well known in the art. A changed logical block number is a reference to a block of data where the data of that block has been changed. Thus, storing a changed logical block number is storing a logical block number referencing a block of data that has changed. *See Application, p. 44, ll. 16-22*. The Applicant respectfully requests that the Examiner withdraw the rejections of claims 4-5.

Claim Rejections – 35 U.S.C. § 102

Claims 4-8, 29-31, 35-37 and 42-44 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,889,935 (Ofek, et al.).

Ofek does not teach storing changed logical block numbers in a buffer rather than storing changed data in the buffer as recited in claims 4, 6, and 8. The LRU queue 503 of Ofek “contains pointers to cache blocks that are available to be allocated.” *Ofek, Col. 36, ll. 34-36*. Thus, the LRU queue contains pointers to unused blocks, not changed logical block numbers. The link queue 504 of Ofek “contains a respective entry for each command that is transmitted over the link 240.” *Ofek, Col. 36, ll. 59-61*. As a result, the link queue, or FIFO link transmission queue as it is otherwise known, contains read or write commands, not changed logical block numbers. *Ofek, Col. 36, ll. 54-58*. Moreover, even if any of the buffers or queues of the cache 228 of Ofek store a changed logical block number, the changed data always accompanies the changed logical block number. *See Ofek, Col. 16, ll. 62-67, and Col. 37, ll. 21-26*. As a result, Ofek does not teach each and every element of claim 4, 6, or 8. Therefore, the Applicant respectfully requests that the Examiner withdraw the rejections of claims 4, 6, 8, and dependent claims 5, and 7.

Ofek does not teach changing a logical block number in a buffer as recited in claims 5 and 7. Ofek does not teach a reference to a block of data in a buffer and changing that reference when the data of that block is overwritten. Furthermore, Ofek does not disclose two storage locations as recited in claims 5 and 7. The two locations represent the data of one logical block, where the first location holds the data for the block before it is overwritten, and the second location holds the data for the block after it is overwritten. Even if Ofek teaches changed logical block numbers, it does not teach storing the data of that logical block from two points in time. As a result, Ofek does not teach each and every element of claim 5 or 7. The Applicant respectfully requests that the Examiner withdraw the rejection of claims 5 and 7.

Ofek does not teach reading a block of data from a local mirror as recited in claim 29, 30, and 31. Ofek only discloses reading data from a host, not from a local mirror of the data. *Ofek, Col. 16, ll. 41-63*. As a result, Ofek does not teach each and every element of claim 29, 30, or 31. Therefore, the Applicant respectfully requests that the Examiner withdraw the rejections of claims 29, 30, and 31.

Ofek does not teach an ordered queue and a current copy representing a plurality of previous current sets as recited in claims 42-44 as amended. Ofek does not teach previous current sets of data. Ofek discloses multiple methods of storing data from a primary logical volume to a secondary logical volume. *See Ofek, Col. 14, ll. 3-10, and generally Col. 14-21.* The secondary logical volume differs from the primary in the pending transactions from the primary volume. However, even if the secondary logical volume represents a previous state of the data of the primary volume, there is only one such state. Ofek does not teach the multiple previous current sets as recited in claims 42-44. As a result, Ofek does not teach each and every element of claims 42-44. Therefore, the Applicant respectfully requests that the Examiner withdraw the rejections of claims 42-44.

Claim Rejections – 35 U.S.C. § 103

Claims 9-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ofek, et al., as applied to claims 4-8, 29-31, 35-37 and 42-44 and further in view of U.S. Patent No. 6,237,008 (Beal, et al.).

The combination of Ofek and Beal does not teach or suggest a storing means for storing changed logical block numbers including a virtual block allocation structure as recited in claim 9. Beal describes “virtual storage volumes which conform to the host addresses, even though such virtual storage volumes do not exist in reality, but rather exist in a distributed fashion across plural small disk drives.” A storage volume distributed across multiple small disk drives does not suggest storing changed logical block numbers or a means for storing changed logical block numbers including a virtual block allocation structure. As described above Ofek does not suggest storing changed logical block numbers. The addition of Beal does not cure the deficiencies of Ofek. As a result, the combination of Ofek and Beal does not teach or suggest each and every element of claim 9. The Applicant respectfully requests that the Examiner withdraw the rejection of claim 9 and dependent claims 10 and 11.

The combination of Ofek and Beal does not teach or suggest a virtual block allocation structure including block checksums rather than block data as recited in claim 10. Ofek “transmits over the link the header, followed by the data, followed by a cyclic redundancy check (CRC).” The CRC is generated for and transmitted with the transmitted data and header to check for errors when the header and data are received. It is not stored in a buffer instead of the data. The data accompanies the CRC. The addition of Beal does not overcome the deficiencies of Ofek. As a result, the combination of Ofek and Beal does not

teach or suggest each and every element of claim 10. The Applicant respectfully requests that the Examiner withdraw the rejection of claim 10 and dependent claim 11.

In addition, the combination of Ofek and Beal does not teach or suggest transmitting block checksums rather than block data across a journey link as recited in claim 11. Even if the CRC of Ofek is a block check sum, as described above in reference to claim 10, the CRC is transmitted with the data. In contrast, claim 11 transmits the block checksum without the block data. The addition of Beal does not overcome the deficiencies of Ofek. As a result, the combination of Ofek and Beal does not teach or suggest each and every element of claim 11. The Applicant respectfully requests that the Examiner withdraw the rejection of claim 11.

Claims 17-24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,311,193 (Sekido). Sekido does not discuss buffering commands from snooping a bus, particularly SCSI commands as recited in claims 17-24. Furthermore, the references cited by the Examiner appear to refer instead to U.S. Patent Application Publication No. 2004/0233910A1 of Chen et al. For example, Sekido's SAN SCSI driver does not exist, nor does step 525 of FIG. 5. These references do exist in Chen.

However, Chen's filing date was February 23, 2001. The Applicants have claimed priority in the Application to application number 09/438,148 filed November 11, 1999, and provisional applications 60/209,469 filed June 5, 2000, 60/223,934 filed August 9, 2000, and 60/262,143 filed January 16, 2001. All of the claims remaining in the case are supported by one or more of the above described applications. All of the above described applications predate Chen. Therefore, the Applicant respectfully requests that the Examiner remove Chen as a prior art reference and withdraw the rejections of claim 17-24.

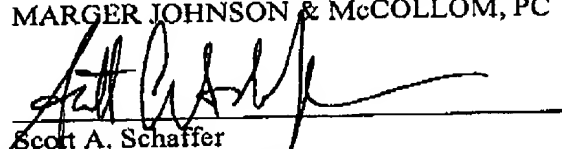
CONCLUSION

For the foregoing reasons, reconsideration and allowance of claims 4-11, 17-24, 29-31, and 42-44 of the application as amended is solicited. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

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Respectfully submitted,

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